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ABSTRACT

Teacher action research using both qualitative and quantitative methods of data collection were used to examine impacts of using visual learning strategies on five preschool children (ages 3-5) with autism in a self-contained classroom. During the six weeks of the study, pictures representing nine learning areas and specific developmental activities were used for giving directions, helping children make appropriate choices, helping them follow sequences, and scheduling the day's activities. Data were collected using a parent survey, checklists, observations, videotapes, parent reports, and developmental scales. Results indicate the listing of the day's events in picture form gave structure to clarify communication, support transitions, and help student understanding. The greatest benefit seemed related to age, with the older children being more easily redirected to the expected activity. Picture sequences were found to help the older students become more independent when performing the steps of a routine such as hand-washing, however, the younger two were inconsistent in their responses. Social stories also had a positive effect on the older children when families incorporated stories into their routines at home. Choice boards that allowed students to select their snacks were effective for all, while a situation board was effective with the older participants. (Contains 41 references.) (CR)

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Freeing the Child: Using Action Research on Visual Learning Strategies to Develop Children with Autism

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Abstract

Teacher action research using both qualitative and quantitative methods of data collection was used to examine impacts of using visual learning strategies on preschool children with autism. The teacher's own practice within the classroom was also evaluated, incorporating innovations into the curriculum. Freeing the child to develop cognitive, social, and communication skills was an outcome, helping parents, educators, and policy makers better understand what causes certain reactions and what strategies may help these children better develop relative to their relationships with others. An extra element of this study was that it reached beyond the classroom into the homes of the children involved, shaping and changing learning environments.

Introduction

In this study, teacher action research (using both qualitative and quantitative methods of data collection) was used to examine the impacts of using visual learning strategies on preschool children with autism. As an early childhood teacher, I used action research to help me more systematically examine my own practice, incorporating innovations into the curriculum and reaching beyond the classroom to collaborate with families.

Peg's Experience as a Teacher Developer Through Action Research

There is no single description or prescription for teacher action research. Rather, there are continua reflecting various biases of how and why such designs might be appropriate in the educational research arena (Llorens, 1994; Noffke, 1997). Some discuss it as a process through which teachers can examine their practices (Johnson, 1993; McNiff, 1995). Here, through a critical theorist lens (McCutcheon & Jung, 1990), teachers' and students' development are seen as inextricably woven and mutually freeing.

Our story is multiple. I (Peg) am a university teacher committed to helping other educators develop by becoming more reflective practitioners through research designs such as action research. Laura is an early childhood teaching specialist who primarily works with children who have autism.

As Laura neared the completion of her doctoral program, we discussed research designs and what each might offer to her and her students. She decided that teacher action research could be the most viable approach because she wanted to implement and evaluate several teaching innovations with her students – both in the classroom and with their parents at home.

This narrative reflects Laura's praxis (Freire, 1970) as she attempted to enhance learning opportunities for her students through her action research project. Meet Philip, Dennis, James, Shirley, and Zack (pseudonyms) – five three-to-five year olds who may enjoy more rewarding lives as a result of their participation in this very special study.

In this study, Laura worked with five children and their parents to reshape their school and home learning environments. She also began to deliver her curriculum through innovations she was exploring through research- and practice-based literature. Specifically, she redesigned her practice to use multiple visual learning strategies since she had come to believe that her students might develop more effectively if these approaches were emphasized. A consummate professional, she used her dissertation to systematically evaluate the impacts of these innovations on her and her students.

Laura's Experience as an Action Researcher

Before I began my doctoral program, my concept of research was limited to that which could be measured in numbers, such as showing growth (or the lack of it) in students' achievements. However, when dealing with children who have autism (who reflect different developmental patterns from peers without autism), numbers cannot always generate a true picture of their efforts and growth.

I began blooming as an action researcher during my research courses and dissertation process. At first, I learned about teachers using qualitative research to allow for case studies or other field based descriptions of their contexts. I knew early in my program that I would use some form of qualitative research because of the nature of my students.

Later, I learned that teachers can use qualitative action research to examine the impacts of their practices on students in their classroom. I believed this was going to be a good fit for my teaching assignment. Changes in what is believed about autism have been reflected in the literature during the past ten years, along with methods considered to be more effective relative to student's development and learning. In addition, I had been asked by our child find department to help evaluate materials and programs being used for this preschool population.

At first, I was awed and apprehensive about the magnitude of the process. Early searches through the literature made me realize that very specific innovations were needed to improve development of these students, but that there were differing opinions about some of those methods. I felt somewhat overwhelmed by the magnitude of the number of conflicting strategies considered to be effective. I began to realize I would need a systematic way to collect and analyze data, taking one step at a time.

Through continued literature review and attendance of conferences in which higher-functioning persons with autism spoke of their experiences, I decided the first area I wanted to pursue involved the use of visual strategies. Then I began to focus on a number of specific innovations I felt could be handled during this study. I developed data collection tools, color coding to assist in management of the data(which was collected widely to get a better understanding) to make analysis easier. Analysis was done on an on-going basis, further defining and refining the situation.

Parents of children with autism often feel great frustration by the time they are able to get their children into school programs. I read about using this research design to reach beyond the classroom—into the homes of students and their parent(s) or

caretaker(s). This led to refinement of my research design to include this factor. Collaboration with families allowed for reshaping of school and home learning environments maximizing success.

During data collection, I sometimes felt the data was too broad and perhaps I should have eliminated some elements, but as I was doing the final analysis, I realized that all of them were needed to get a full picture. Children were able to demonstrate progress in different ways and on different measures. If some had been omitted, I might not have recognized particular effects of innovations with some children.

When I began to look at the results, there were some surprises. It was exciting to see documentation of the progress each child made during this time period and try to determine the relationships between the innovations and the progress made with each child.

Laura's Action Research Project: Impacts of Visual Learning Strategies on Children with Autism

The number of students identified with autism at a young age is increasing in my mid-Florida county. In order to meet the needs of these children, two new classes have been established for pre-kindergarten children. The main focus of these classes is to help children overcome individual cognitive or affective deficits, with special emphasis on the development of language and social skills.

There has been a radical change in beliefs about autism over the past 10 years (Quill, 1995; Janzen, 1996; Olley, 1992). My study was designed to examine the effects of best teaching practices in the field today, as described by experts such as Prizant (1999), Myles (2000a, b, c), and Mirenda (2000).Through my project, I hoped to add to

the body of knowledge regarding ways in which preschool children with autism can better cope with their differences while learning through them. Ideally, results will help parents, educators, and policy makers better understand what causes certain reactions in students with autism and what strategies may help them better develop relative to communication skills and their relationships with others.

Autism Defined

Autism is a neurological disorder of development that causes information processing differences affecting children's ability to understand and use language to interact and communicate with people, relate to those around them in typical ways, respond to sensory stimuli, and learn in the same ways as normally developing peers. Janzen (1996), Quill (1995), Heflin and Simpson (1998a), Strain and Kohler (1994), Hodgdon (1998), and Prizant (1999) agree that one of the defining characteristics of autism is related to differences in children's development of language, communication, and social skills.

According to the American Psychiatric Association's *Diagnostic and Statistical Manual* (1994), autism manifests (before age 3) abnormal functioning in "social interaction, language as used in social communication, or symbolic or imaginative play" (p. 71). Earlier, Kanner (1943) described children with the disorder as being isolated in play, having unusual language traits, insistence on ritual behavior, and resistance to change. These aspects of his definition are still considered descriptive of persons with autism.

Incidence

Autism, which has been found throughout the world in all types of families, is

four times more common in males. Children are being diagnosed with it at increasing rates (as we better understand it and have more specific definitions) and 15 to 20 children out of every 10,000 births are predicted to be diagnosed with it (Janzen, 1996). With this increase comes added pressure on school systems to develop programs of instruction for these children.

Literature Review

Developmental Differences

In education, theorists have assumed that children follow similar developmental paths, although at different rates. Children with autism, however, show unique developmental patterns which include relative strengths in the areas of concrete thinking, rote memory, and understanding what they can see and touch, and weaknesses in abstract thinking, social understanding, and communication (Olley, 1992; Janzen, 1996).

Infants typically have an innate drive to learn language and to socialize, acquiring these skills seemingly automatically. They begin to turn their heads toward sound, watch people, maintain eye gazes and establish communication with smiling, chuckling, and, later, pointing. Young children with autism, however, often do not do any of these things. They frequently resist cuddling by arching the back, seeming to prefer being left alone. They do not hold eye gazes or even turn to a person who is speaking (Janzen, 1996; Olley, 1992).

Quill (1995) reports that intelligence tests reveal that children with autism usually perform best on tasks that involve visual elements that remain in view, such as shape discrimination, matching, copying, and puzzle assembly. These children commonly have an interest in numbers and letters, because of the predictable order. Motor skill

development follows a more normal sequence, but shows some delays in fine motor skills related to resistance to pressures and substances on the hands, which may be painful (Janzen, 1996). In language skills, they may have mastered a few scattered items on a checklist, but do not follow a sequential pattern of development.

Communication Skills. Difficulties in communication have been identified as one of the primary features of autism (Calloway, Myles, & Earles, 1999; Cafiero, 1998; Janzen, 1996). Schwartz, Garfinkle, and Bauer (1998) and McCathren (2000) believe that delays in communication can affect children's abilities to interact effectively and can affect other types of development. Because of the dramatic impact of communication delays on individuals with autism, communication patterns related to the disorder have been an area of interest since its recognition (Calloway, et al., 1999). Bondy and Frost (1994) believe that a primary goal of teaching children with autism should be improved communication.

Attention Capacity. Children with autism lack abilities to share focus of attention with others. They shift attention quickly and are usually unable to understand a social context. These traits often contribute to an inability to maintain conversation with others. Also, their play is often limited to isolated exploration of objects, without imaginative pretend play (Quill, 1995; 1997).

Social Competence. Many typically developing preschool children acquire peer-related social competence, such as sharing, exchanging play ideas, negotiating, and responding to aggression, through natural social interactions when given opportunities to interact. However, Odom, et al. (1999), in their review of literature, found that young

children with these types of disabilities engaged in less social play, had fewer interactions, and did not develop social competence without intervention.

Behaviors. Children and adults with autism often respond in unusual ways to sensory stimuli, overreacting to sounds or touch. Myles (2000a) stressed that persons with autism can have difficulty predicting, reading intentions, understanding emotions, explaining their own behavior, and understanding that their behavior has an impact on others. As educators and parents become more aware of these differences, however, more effective interventions can be developed to meet their needs.

Best Practices

Today, researchers and practitioners believe that learning to build on the strengths of children who have autism through the use of visual or picture cues can help them developmentally. Using such cues may help them better understand daily schedules, how to anticipate events, decrease confusion, and explain changes in their routines. Pairing visual cues with spoken or written language, hopefully, will increase the likelihood that children with the disorder will gain more meaning from information received (Quill, 1995).

McClean and Odom (1993), in their comparison of practices recommended by Division for Early Childhood (DEC)(1993), and National Association for the Education of Young Children (NAEYC)(1991), stated that family centeredness and advocacy position were critical when providing services to young children. This could help families become equal members in all aspects of their children's programs.

Methods

For this study, I created a qualitative action research project, as

described by Bogden and Biklen (1998), using both qualitative and quantitative methods of data collection to discover the impacts of specific innovations (using visual cueing systems) on my students. Data were analyzed using the process defined as analytic induction (Gall, Borg, & Gall, 1996). In this study, I worked with parents of students with autism as we shaped and changed our classroom and home learning environments. The innovations used were incorporated into my curriculum, working toward individualized goals for each student.

Participants

All five students in my classroom (during the study period) were included. One was a four-year-old boy who was in my class last year. A five-year old girl began school for the first time this fall (2000). In addition, three boys (who had recently turned three) were just beginning to attend. In the beginning, none of the children spoke more than a few words. However, the four-year old occasionally repeated scripts or phrases from favorite videos (an example of echolalic speech)(Quill, 1995). None of the students had independent toileting or eating skills and all required a great deal of physical assistance throughout the day.

Setting

These students were in my self-contained classroom five days a week from 8:30 a.m. to 3:00 p.m. Throughout the year, the room was divided into centers including "Art," "Task Boxes," "House," "Blocks," "Table Toys," "Sensory Table," "Computer," "Circle," and "Science." During the six weeks of this study, March 15 to April 30, 2001, pictures representing these areas and specific developmental activities were used for

giving directions, helping children make appropriate choices, helping them follow sequences, and for scheduling the day's activities.

Innovations

The abilities and learning needs of each child were considered when developing individualized programs. As suggested in the literature, I took note of specific conditions which predicted greater success for each child. Quill (1997) reports that a "shift in emphasis from language-based instruction to more visual instructional supports appears to be one treatment option for many children" (p. 710).

Visual Schedule

Visual schedules (the listing of events for the day in picture form) are believed to help improve student understanding and cooperation (Hodgdon, 1998). They are intended to help clarify communication between staff and students, redirect students to an activity of the moment, give structure to help students understand and accept change, and support transitions (Hodgdon, 1998; Quill, 1995).

Skill Sequences

Quill (1997) reports that "acquiring daily living skills can be difficult for children with autism" (p. 709) but that the use of visual displays of skill sequences can help them acquire and maintain the skills. Prizant (1999) referred to these as a work system, used to help children know what is expected and how to complete a task independently.

Social Stories

Quill (1997) proposed that social communication attempts by children with autism may be lacking due to the absence of visible contextual cues which appear to guide their patterns of communication. Social stories often are written in response to an

individual child's needs (Janzen, 1996; Kuttler & Myles, 1998). They can "describe the situation; direct the child in what to do and say; and explain how others feel, think, and act in a simple, concrete manner" (Quill, 1995, p. 17).

Choice Boards

Whenever choices (for the children) were possible, a short grouping of pictures was presented from which participants could select activities, snacks, stories to hear read, songs to be sung, or videos to be watched (Hodgdon, 1998; Mirenda, 2000).

Picture Cards

In order to make communication boards more portable, pictures/symbols were placed on a metal ring. Janzen (1996) refers to these as cue cards which can provide visual references to help learners recall words or a step in a routine, make a choice or assist in a transition.

Situation Boards

Situation boards were designed for particular places or situations. Hodgdon (1998) and Cafiero (1998) agree that children with autism have communication needs that are specific to one activity or environment. For instance, a situation board for a playground could have choices such as swings, tricycles, balls, slides, a drink of water, sand pails, shovels, sidewalk, and/or chalk.

Collaboration With Home

Cafiero (1998) believes that the creation of language boards and other learning strategies should involve teams of individuals in a child's life (e.g., parents, siblings, and staff) "to provide input and...ownership for the new language being created" (p. 114).

Families and schools can help to establish routines based on the demands of their unique environments (Hodgdon, 1998).

Data Collection Methods

For this qualitative action research study, several types of documentation were used including both qualitative and quantitative methods. This helped to provide depth of understanding relative to the impacts of various innovations.

Qualitative Methods

Parent Survey. The survey I used (before introducing the innovations) was that used by the school system as a part of archival records (see Appendix A). This survey reflected parents' concepts of what their children could and could not do, how they related to others, and particular dreams and concerns of each family. After the study, I administered a second survey (see Appendix B) to help determine parent perceptions of ways in which using visual strategies helped to change their children's awareness, communication efforts, and interactions with others.

Home Notes. These were forms I used for daily communication between me and the students' parents about events of the day in class. They were used to record observations relative to visual schedules, skill sequences, social stories, choice boards, picture cards, situation boards, and my collaborative efforts with the parents.

Checklists. These were used to tally simple events such as trips to the bathroom. Checkmarks indicated whether a child or teacher initiated the visit, whether a communication picture was used, what was accomplished, the level of independence, and if instructions were given.

High/ScopeForm. These were forms used to document various developmental skills in a narrative. Sections of the form corresponded with the focus areas of the High/Scope Child Observation Record (an adaptation of the documentation record recommended by our county for preschool classrooms) (High/Scope, 1992). Documentation was made on this form regarding the use of visual schedules, skill sequences, social stories, choice boards, picture cards, and situation boards.

Videotapes. These allowed me to document sequences of events as they occurred. Later I took notes while viewing the tapes. Sometimes it was difficult (during times of actual intervention) to record everything that occurred, and memory can be selective. This method helped me add to the accuracy of my notes and interpretations.

Parent reports. These documents recorded parents' observations at home relative to the use of skill sequences, social stories, choice boards, picture cards, and situation boards. Thus, they added parent's perspectives throughout the study to the analysis of data collection.

Quantitative Methods

Archival records of developmental scales (Brigance [1991], and DILS [ERIN 1993]) were compared with results on the same scales at the end of the implementation period. Each scale gave age-level scores supporting the interpretation of qualitative data.

Data Analysis

Data analysis was an ongoing part of data collection. I collected data widely to get a broad understanding of the situation, as described by Bogdon and Biklen (1998). I noted (in High/Scope observation logs, Daily Home Notes, and daily diary) comments about what I learned, linked, or assumed as the study evolved over the six weeks. After

completion of daily data collection methods, I compared parent survey responses, students' skills mastered on developmental scales, checklists and narrative observation logs, videotapes and notes in regard to them, parent reports, and archival records before and after innovations. Coding categories were generated to organize the data. Data were sorted student by student with color-coded markings for sub-categories to indicate impacts of each innovation.

One aspect different about my study from others described in the literature was that I made duplicate materials (used at school) for use in the home (as appropriate). Also, I used parent reports as part of the data collected. This helped to expand my knowledge and also supported interpretations of the data.

Following is a chart reflecting specific qualitative data collection methods relative to each innovation (see Figure 1). Home Notes were used to record data in each category while High/Scope forms and Parent Reports were used in most categories.

Figure 1

Innovations by Qualitative Data Collection Methods

	Parent Surveys	Home Notes	Checklists	High/Scope Form	Videotapes	Parent Reports
Visual Schedules		X		X	X	
Skill Sequences		X	X	X		X
Social Stories	X	X		X	X	X
Choice Boards		X	X	X	X	X
Picture Cards	X	X	X	X		X
Situation boards	X	X		X	X	X
Collaboration with Home		X				X

Figure 1. Innovations and the methods used for documentation of impacts.

Results From Qualitative Data Collection Methods

The innovations used were incorporated into my curriculum, working toward the individualized goals of each student with autism. The older children demonstrated growth on all measures. The younger ones also demonstrated progress, but on fewer measures.

Impacts of Visual Schedules on Students

These listings of the day's events in picture form were used with each of the children. They were arranged downward and divided into three segments. Phillip, Dennis, James, Shirley and Zack (all pseudonyms to protect participants' privacy) demonstrated evidence of impacts from this innovation. Tantrum behavior during the morning routine up through outside play time almost disappeared for each of these children.

For instance, Phillip, a four-year-old boy, often wanted to go outside to play soon after he arrived. However, after working with visual schedules, he appeared to understand that certain things needed to be done first. He then willingly participated in circle time and completed the three task boxes required.

Impacts of Skill Sequences on Students

These sequences were used to show the steps in the process of hand-washing, toileting, following a recipe, and developing a craft project. Children's responses to the hand-washing sequence was the most consistent out of the four types of activities used with all the children.

Impacts of Social Stories on Students

These stories were used to prepare for a field trip, encourage expected behaviors and to describe situations that could occur (which might be difficult for the students).

Most of the participants exhibited increased cooperation and one increased verbalizations in response to these stories.

Impacts of Choice Boards on Students

One of these was designed to help the children make choices about activities during scheduled times throughout the day. Another board involved an electronic device with voice output to request snack foods. All of the participants were successful when food was a choice. However, only two consistently mastered its use for other purposes.

Impacts of Picture Cards on Students

These pictures were on a ring to be carried around in various situations when away from the room. Results of these cards on the children's behavior were inconsistent.

Impacts of Situation Boards on Students

These were similar to choice boards, but specially designed for particular situations. Success was noted in their use in music class, but not in the other situations attempted.

Impacts of Collaboration with Home on Students

Upon consultation with parents, visual cueing instruments (pictures, sequences, and social stories) were shared according to what they said they wanted to try at home. Some were duplicates of materials used at school. Others were specially designed to meet needs expressed by families. Families who used the pictures did state that they were effective in reducing their children's difficulties when facing new situations.

Figure 2

Results From Qualitative Methods

Innovation	Phillip	Dennis	James	Shirley	Zack
Visual Schedule	Helped to understand sequence of events before preferred activity	When combined with objects, transitions and wait time for outside made easier	Helped redirect attention without continual verbal instructions	Helped clear up confusion between activity after breakfast and one after lunch	Combined with objects, transitions made easier
Skill Sequence	Eliminated need for verbal prompts	Continued to need physical prompts	Reduced resistance and need for verbal prompts	Complete independence for toileting and hand-washing	Continued to need physical prompts; parent reported success
Social Stories	Increased cooperation	No effect noted	Attended to photographs of classmates in one story	Duplicated negative behavior in one story; Positive effect on cooperation for field trip	Increased verbalizations; parent reported success with ones created for home situations
Choice Boards	Mastered use of boards; increased verbalizations	Successful when used to acquire food items	Successful use for acquiring food items; sometimes used for other choices	Quickly mastered the use of the boards	Successful for food items; inconsistent for other uses
Picture Cards	Used to request bathroom; responded to some teacher requests	Responded on 4 occasions; no child initiations	Responded on 10 occasions; no child initiations	Consistent use to request bathroom; responded to some teacher requests	No positive responses noted at school; mother reported success at home
Situation Boards	Successful use in music class; no interest on playground or field trip	Only with adult assistance	Successful use in music class; inconsistent use in other situations	Successful use in music class; inconsistent use in other situations	Only with adult assistance
Collaboration with Home	Used bathroom symbol, special social stories	Good success with adjustment to new diet with few of old favorite foods	Not used	Not used	Sequences, Social Stories, food choices all used with success

Figure 2. Results of each innovation with each child.

Results From Quantitative Data Collection Methods

Specific developmental skills were measured twice during the year (once before my study as a part of the normal routine for school records and once after my research was completed). Brigance (1991) and DILS (Early Recognition Intervention Network [ERIN]1993) were used. Brignace and DILS yielded age-level scores. The scores reflected here represent the measures taken in September, 2000 (or when the child enrolled) and again at the end of my study, April 2001 (see Figure 3).

Philip

According to the pre- and post-administrations, Philip demonstrated a gain of at least one year on each sub-test of both the Brigance (1991) and the DILS (1993). In the area of fine motor skills, he demonstrated a gain of two and one-half years on the DILS Visual Motor subtest.

Dennis

Comparing the pre- and post-administrations, Dennis demonstrated a gain of at least six months on each sub-test. The Brignace (1991) showed greater gains than DILS (1993), with gross motor skills measuring a two-year gain and at least one year in fine motor, pre-academics, and social skills on the Brigance.

James

James demonstrated gains of one year or more on each sub-test, except communication (showing six and eight-month gains) on the Brigance and the DILS. His greatest gain (two-year, six-month)was shown in self-help skills, as measured on the Brigance (1991).

Shirley

Shirley demonstrated gains of at least one year, and in many cases two years on each subtest. The greatest gains were shown in pre-academic and self-help skills (two and one-half year gain), as measured on the Brigance.

Zack

Zack, who had only been in the class for two months, demonstrated a gain of at least six months on each sub-test. His greatest gain (two-year, six month) was shown in pre-academic skills, as measured on the Brigance. He showed a gain of one and one-half years in social skills, as measured on the Brigance.

All of the participants demonstrated progress, which will be further discussed in the next section. Some growth could be accredited to simply growing older, while other aspects may be related to the visual strategies used.

Figure 3

Developmental Scale Data

		Brigance				DILS		
		Pre	Post	Gain/Loss		Pre	Post	Gain/Loss
Philip								
	Gross Motor	3-0	4-0	+1-0		3-0	4-6	+1-6
	Fine Motor	4-0	6-0	+2-0		3-0	5-6	+2-6
	Self Help	2-0	3-0	+2-0				
	Communication	1-3	2-9	+1-6		2-6	3-6	+1-0
	PreAcademics	3-0	4-9	+1-9				
	Social Skills	1-6	3-6	+2-0		3-0	4-6	+1-6
Dennis								
	Gross Motor	1-0	3-0	+2-0		1-6	2-0	+0-6
	Fine Motor	1-0	2-0	+1-0		1-6	2-0	+0-6
	Self Help	1-0	1-6	+0-6				
	Communication	0-4	1-0	+0-8		1-6	2-6	+1-0
	PreAcademics	1-6	2-6	+1-0				
	Social Skills	0-7	2-0	+1-5		1-6	2-6	+1-0
James								
	Gross Motor	2-0	3-0	+1-0		2-0	3-0	+1-0
	Fine Motor	07	2-6	+1-11		1-6	2-6	+1-0
	Self Help	1-3	2-0	+2-6				
	Communication	0-4	1-0	+0-8		1-6	2-0	+0-6
	PreAcademics	0-6	2-0	+1-6				
	Social Skills	1-0	3-0	+2-0		2-0	3-6	+1-6
Shirley								
	Gross Motor	2-0	3-0	+1-0		2-0	4-0	+2-0
	Fine Motor	2-0	3-6	+1-6		2-0	3-6	+1-6
	Self Help	1-6	4-0	+2-6				
	Communication	1-0	2-9	+1-9		1-0	2-6	+1-6
	PreAcademics	0-6	3-0	+2-6				
	Social Skills	1-6	3-6	+2-0		1-6	3-6	+2-0
Zack								
	Gross Motor	1-0	1-6	+0-6		1-0	2-6	+1-6
	Fine Motor	1-6	2-0	+0-6		1-6	2-0	+0-6
	Self Help	1-0	1-6	+0-6				
	Communication	0-4	1-0	+0-8		1-6	2-6	+1-0
	PreAcademics	0-6	1-6	+1-0				
	Social Skills	1-0	2-6	+1-6		2-0	3-0	+1-0

Figure 3. Results from Developmental Inventories in age (years-months)

Summary, Implications, and Recommendations

Visual Schedules

This listing of the day's events in picture form gave structure to clarify communication, support transitions, and help student understanding (Hodgdon, 1998; Janzen, 1996; Prizant, 1999; Quill, 1995, 1997). Each child demonstrated evidence of being impacted with visual schedules. The greatest benefit seemed related to the age of the child, with the older children being more easily redirected to the expected activity. They also seemed to understand the need to delay a desired activity until certain other things on the schedule were done. In one case, a child was able to clarify her understanding that mats were to be brought out after the noon meal, but not after breakfast. However, the youngest two required concrete objects, such as blocks, plastic letters or numbers, or paint brushes, in addition to the pictures to make transitions effectively. [They were able to make their transitions more easily (with less resistance) than before.]

Skill Sequences

Quill (1995, 1997), Prizant (1999), and Clarke, Dunlap, and Vaughn (1999) agree that use of visual displays of skill sequences can help children with autism to acquire and maintain skills that are often difficult for them. In my study, picture sequences remained in view for the children to refer to as often as necessary to understand what was expected and how to complete the tasks. These helped the older three students become more independent when performing the steps of a routine such as hand-washing. However, the younger two were inconsistent in their responses, in many cases refusing to even look at them. In addition, they continued to require physical prompting to begin the process.

However, they sometimes continued with the visual prompts to complete tasks. Perhaps the pictures were not sufficient for them to understand what was expected. Their first response was resistance until my intent was clarified by showing them an object to be used in the activity.

Social Stories

Several researchers (Gray, 1991; Reese & Challener, 1999; Myles, 2000b; Kuttler & Myles, 1998) have found social stories to have a great impact on persons with autism. Because they have difficulty understanding social situations and expected responses, such stories can provide information about situations, giving directions and choices, and helping students to understand how to react.

Interestingly, in this study, more impact was observed (again) with older children rather than the youngest two. Families who incorporated stories into their routines at home to help children with potential difficulties (airplane ride; mother going away for a few days) experienced the greatest impacts from them.

Ironically, Shirley displayed negative behavior in response to a social story about her problem behavior (biting). She seemed to think that the story invited her to display that behavior. In each case, she had a big smile on her face as she tried to bite me. Thus, that story was quickly replaced with one displaying only positive behaviors and using actual photographs. The new story had some impact on her behavior, but did not completely eliminate the biting. One explanation might be that, besides having autism, Shirley has been diagnosed as TMH (Trainable Mentally Handicapped). Perhaps this form of disability interferes with her ability to make associations regarding expected behaviors. She did respond well to the social story about the field trip. It seemed to calm

her and help her understand what to expect. She was able to see that we would ride a bus, play on a playground, take a walk, eat lunch, play some more, and then ride a bus back to school. Even though she did not know every detail of the day in advance, she had enough information to feel secure, as evidenced by a lack of behavioral outbursts. Another possible contributing factor was that none of the younger students went on the trip with us. (Her worst outbursts seemed to be associated with jealousy over my attention to the others.)

Choice Boards

These allowed students to select pictures representing their choices of activities, wants, and needs. In this study, the one used for snack time was effective for all the participants. A voice output device with five choice buttons was used to request snack items. A recorded voice said "I would like...., please." The older children began to repeat the request verbally, increasing their use of spoken words. The younger children also were able to use the board to request desired snack items. This board was used to train for the use of pictures to communicate wants and needs in various settings. The older participants made the transition easily. The youngest two did not. They required physical objects representing the activities in addition to the pictures

Picture Cards

Impacts from using this innovation were inconsistent. The older two participants had some indication that it helped refocus them on expected behavior. The younger ones only responded a few times and did not initiate communication with them at all.

Situation Board

The board made for music class was effective with the three older participants. They used the board to select activities, instruments, or songs. The two youngest ones required physical prompts or concrete objects to make choices. All other uses of situation boards had inconsistent results.

Collaboration with Home

Three of the five families collaborated with me extensively in developing materials for use at home. Some used a variety of request symbols that also were used at school. Some requested social stories and special situation boards or picture cards to prepare participants for particular events, such as a plane trip, a mother going away for a few days, getting up and ready for school routine, beginning a new special diet, and moving to a new house.

These three deeply involved mothers discussed progress and special needs with me on almost a daily basis as they picked up their children. Each experienced some level of success. Dennis was able to quickly adjust to a new special diet (which had eliminated most of his old favorite foods). Phillip was able to fly on a plane trip to another state for a visit without difficulty. Zack was able to overcome a difficult morning routine with a picture sequence. He also decreased screaming behavior by using picture cards on a choice board to communicate his wants and needs.

Conclusions

With an increasing number of young children being identified with autism in my mid-Florida county. Innovative classes were developed to meet the needs of those students. Heflin and Simpson (1998b) report that the most effective programs for students

with autism are those that incorporate a variety of best practices. Schwartz and Sandall (1998) stress that a specialized curriculum should be embedded into developmentally appropriate activities, documenting effects of instructional strategies and evaluating programs as they are developed.

This study supports the findings of Janzen (1996), Quill (1995, 1997), and Myles (2000 a, b, c) that students with autism can benefit from the use of visual strategies in cognitive, social, and communication skills. In addition, according to these results, these strategies can help to improve behavioral issues, especially with older children (4 and 5-year olds).

Implications

The findings of this study indicate that there may be a difference in the impact of visual strategies based on age, with older students (4 to 5-year olds) making better strides and demonstrating better generalization to other settings. However, all the children in this study demonstrated some progress in cognitive skills, communication, and social skills. It appears that the use of visual strategies may have contributed to this progress. Some of the growth could be credited to maturation, but more progress was made than the number of months involved could explain. The greatest progress, however, was shown in the four and five-year-olds, who demonstrated abilities to generalize skills and concepts (of using pictures to communicate their wants and needs) outside school.

Another possible change for these students was their levels of interest in letters and numbers, which is related to cognitive development. The oldest child (Shirley) did not make as much progress as Phillip, who was one year younger. (Shirley has a

secondary label of Trainable Mentally Handicapped, which could help to explain the amount of progress she was able to make.)

Further study with emphasis on these factors of age and intelligence levels could help to determine why some students make more progress than others. The youngest child, Zack, was able to make dramatic gains during the six weeks he was in school, which coincided with the research period. Even though he was selective in his use of the visual cues to communicate his wants and needs, he was able to make gains in all areas far beyond what was expected for six weeks.

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APPENDIX A

Parent Survey

Appendix A

Parent Survey

CHILD PROFILE (FOR YOUNGER CHILD)

Place a photograph of your child here.

*Child's Name*_____

As your child's parent, you know your child best. You see your child in many different situations and you know how he or she reacts in these different environments. All of this information is very helpful to the people that are involved in assisting you in planning for and serving your child. Please complete this form and give it to the person who is responsible for transition planning for your child. It will help others know your child's strengths as well as any special needs your child might have. The questions below are presented to help you think about what your child can/cannot do. Please add to this list.

Environment How does your child react to a change in his environment? Does he/she seem to be aware of his surroundings? Does he respond to familiar people? How does he/she respond to unfamiliar people? Does your child imitate other peoples gestures? Will he/she respond to rattles and other toys that make noises? Will your child look at picture books, even for a short period of time?

My child can:	My child does not yet:
_____	_____
_____	_____
_____	_____
_____	_____

Communication How does your child let you know what he wants or needs? How do you know when he is hungry, thirsty or tired? Can he/she make different sounds. or repeat sounds that you make? Does your child follow any simple directions such as "wave bye-bye"?

My child can:	My child does not yet:
_____	_____
_____	_____
_____	_____
_____	_____

Parent Survey, page 2

Motor Skills Does your child stay on his/her tummy and back? What way(s) does your child move from one place to another? Does he/she crawl, stand up, pull up, walk, run or climb? What type of things does you child do with his/her hands? Does he/she pull toys, pick up small objects with thumb and first finger, hold a small cup?

My child can: My child does not yet:

_____ _____

_____ _____

_____ _____

Describe your child's daily routine:

_____

_____

_____

Socializing How does your child get along with others? Does he/she play alone most of the time? Does he/she play near other children?

_____

_____

_____

What three words best describe your child?

_____

When is your child the happiest? When is your child most frustrated or upset?

_____

_____

My child's favorite activities/toys are:

_____ _____

_____

Parent Survey, page 3

My child's food

Likes Dislikes

_____ _____

_____ _____

Allergies:_____

My dreams for my child and family are:

_____

_____

_____

My concerns for my child are:

_____

_____

_____

What else would you like us to know about your child and family:

_____

_____

_____

How can we help you accomplish your dreams and goals for your child?:

_____

_____

(South Central Florida County School Board, 1998)

APPENDIX B

Parent Survey II

Appendix B

Parent Survey II

In what ways has your child changed in awareness of their environment, or things around them? _____

Do you feel that using visual strategies (pictures) has helped in this development? Please give examples.

In what ways has your child changed in attempts to communicate to you their wants and needs? _____

Do you feel that visual strategies have helped with development in this area? Explain.

Have there been changes in the way your child interacts with others?

Do you feel that visual strategies have helped your child develop these skills? Explain.

Have your hopes and dreams for your child changed since beginning to attend our class? Did using visual strategies influence those changes?

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